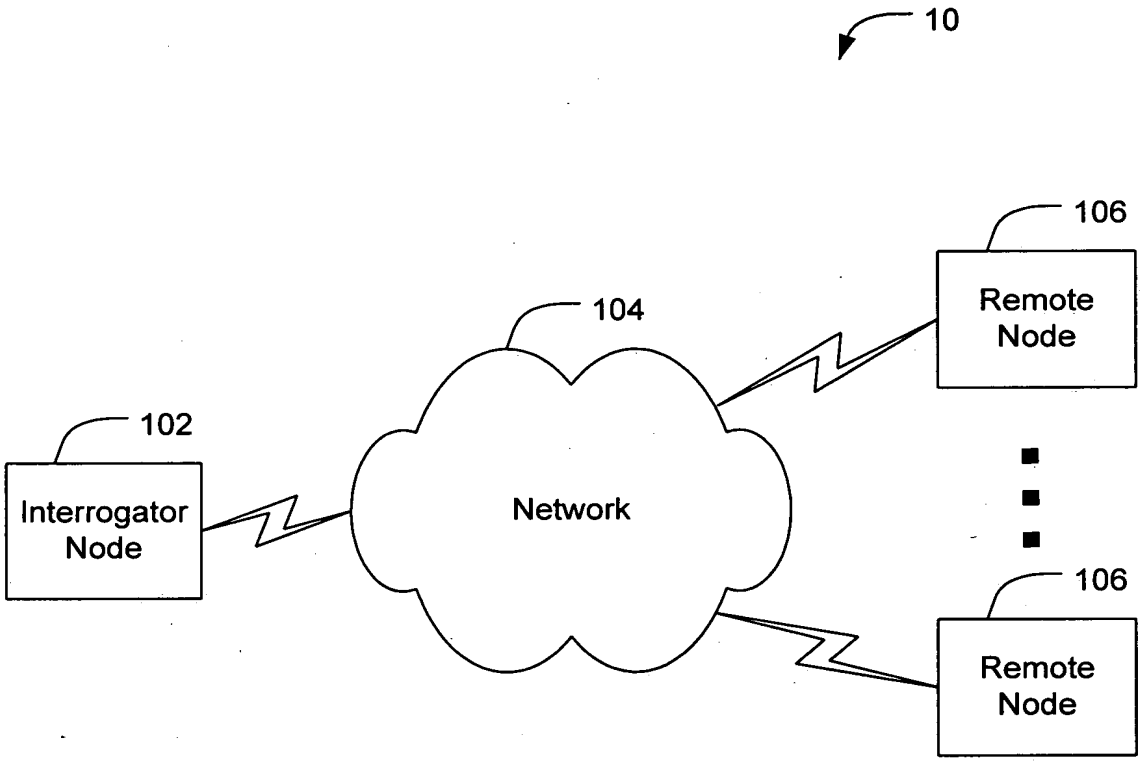
10
106
Remote Node
104
102
Interrogator Node
Network
106
Remote Node

FIG. 1

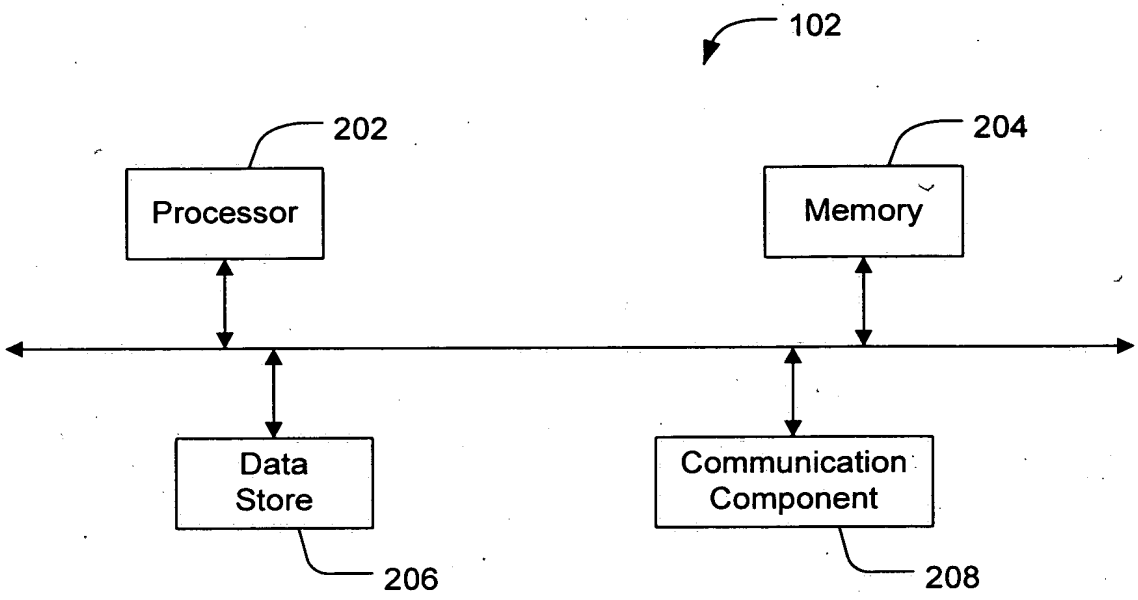
102
202
Processor
204
Memory
Data
Store
206
Communication
Component
208

FIG. 2

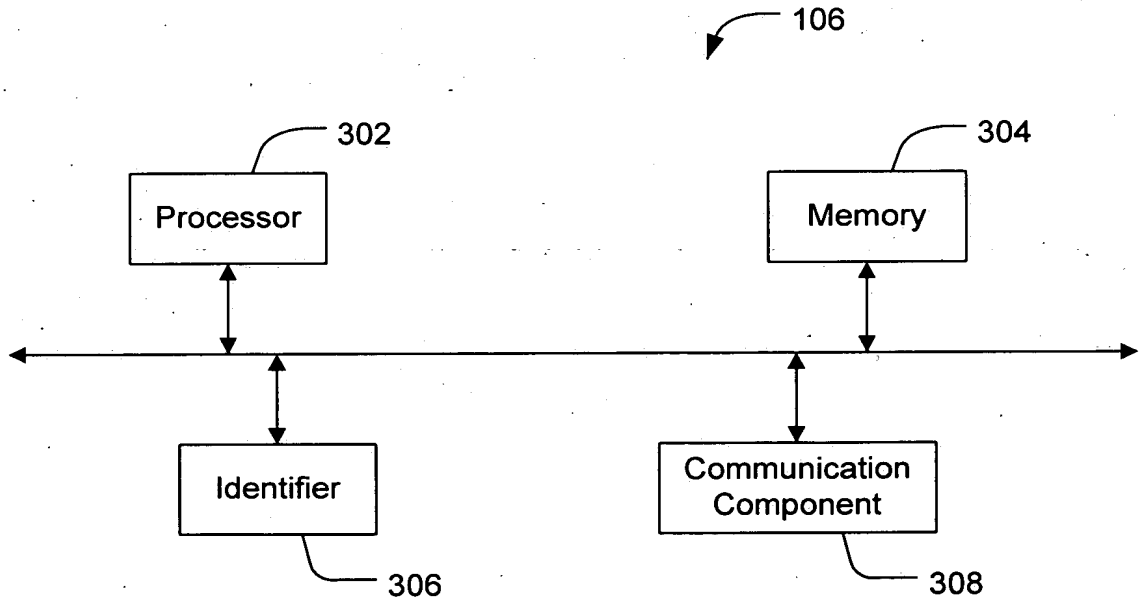
106
302
Processor
304
Memory
Identifier
306
Communication
Component
308

FIG. 3

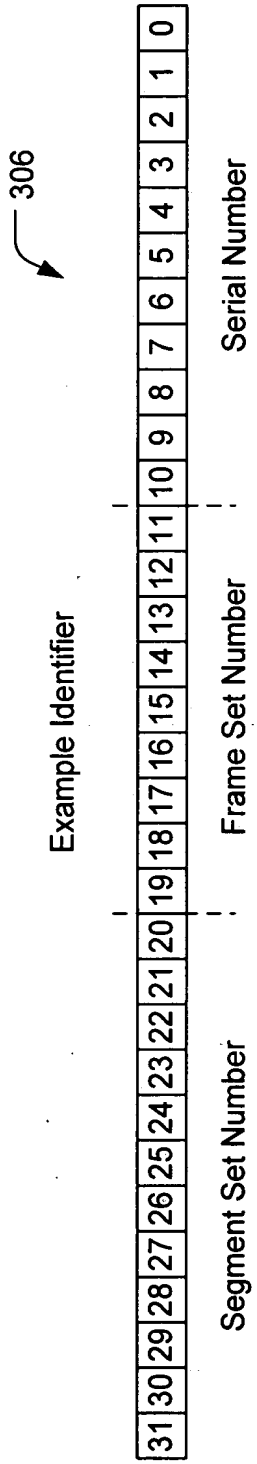
306
31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Example Identifier
Segment Set Number
Frame Set Number
Serial Number

FIG. 4

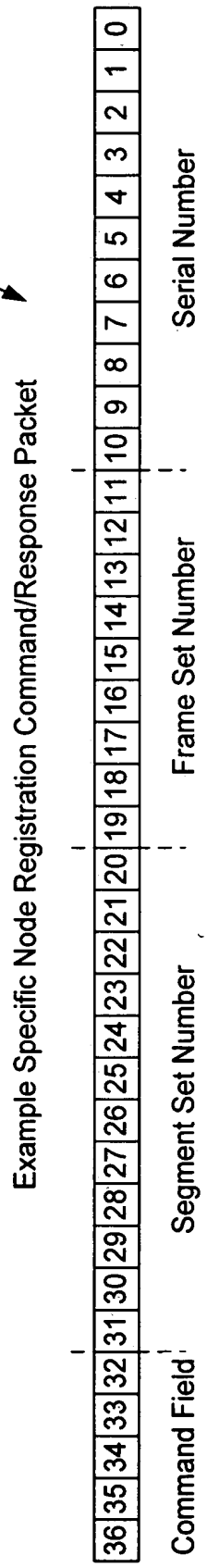
600
36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Example Specific Node Registration Command/Response Packet
Command Field
Segment Set Number
Frame Set Number
Serial Number

FIG. 6

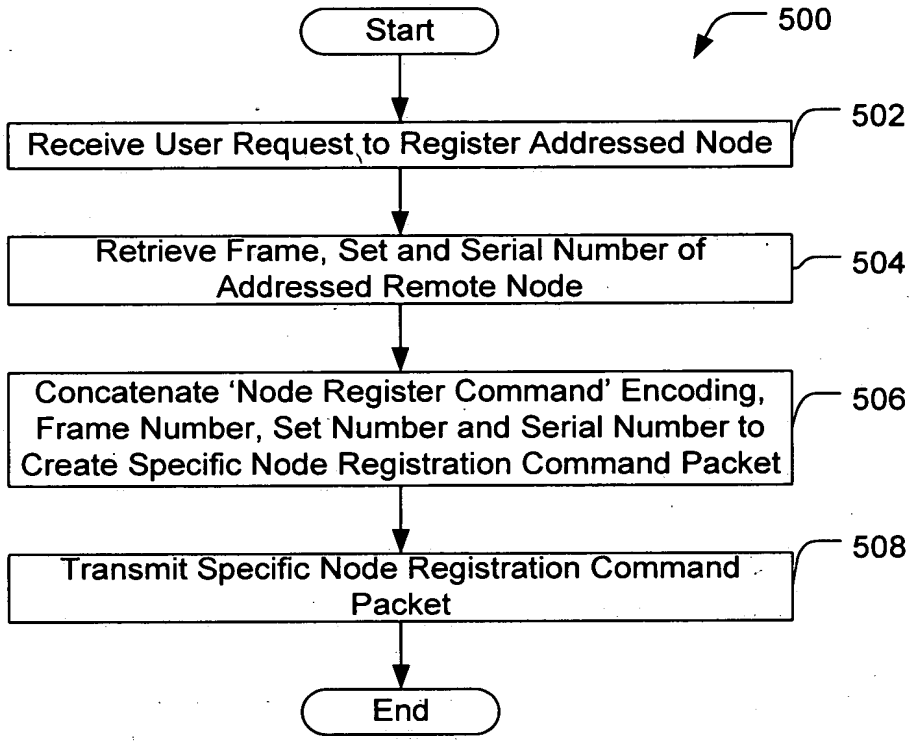
Start
500
Receive User Request to Register Addressed Node
502
Retrieve Frame, Set and Serial Number of Addressed Remote Node
504
Concatenate 'Node Register Command' Encoding, Frame Number, Set Number and Serial Number to Create Specific Node Registration Command Packet
506
Transmit Specific Node Registration Command Packet
508
End

FIG. 5

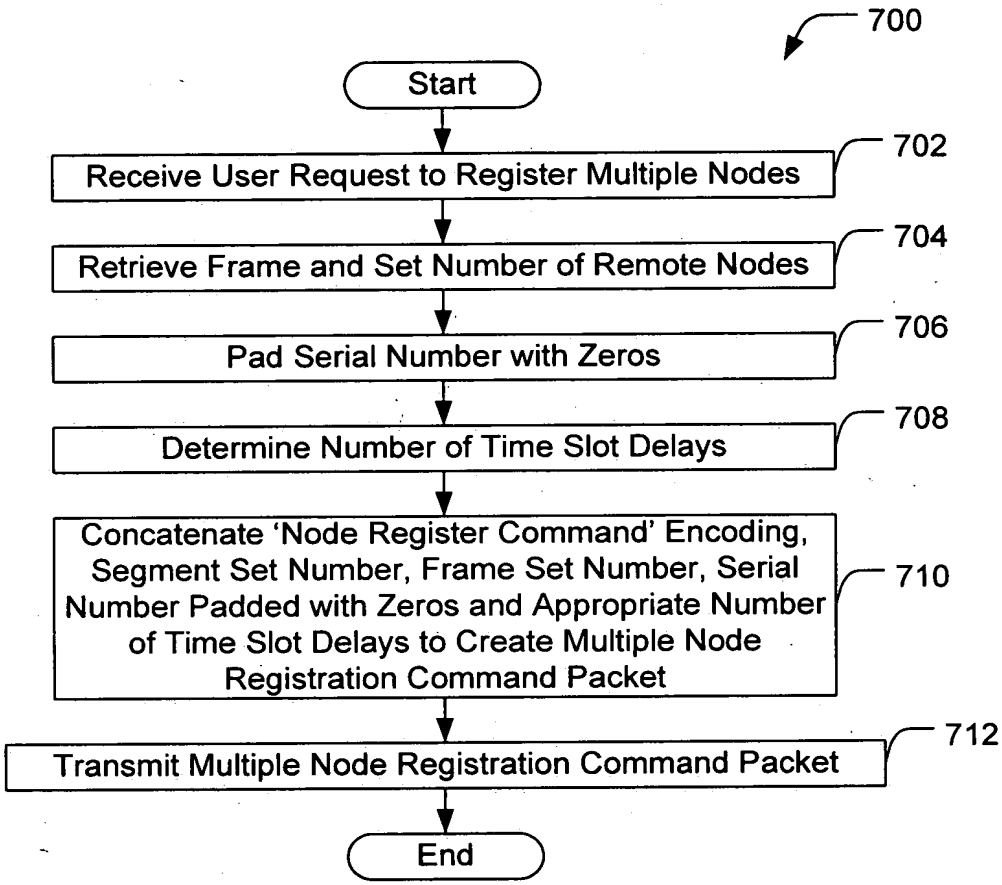
700
Start
Receive User Request to Register Multiple Nodes
702
Retrieve Frame and Set Number of Remote Nodes
704
Pad Serial Number with Zeros
706
Determine Number of Time Slot Delays
708
Concatenate 'Node Register Command' Encoding, Segment Set Number, Frame Set Number, Serial Number Padded with Zeros and Appropriate Number of Time Slot Delays to Create Multiple Node Registration Command Packet
710
Transmit Multiple Node Registration Command Packet
712
End

FIG. 7

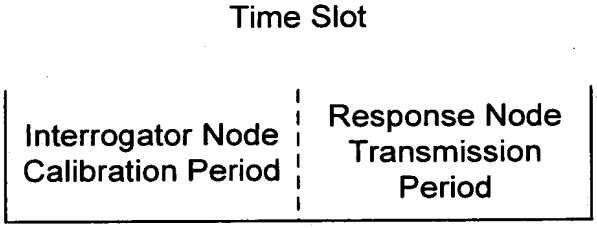
Time Slot
Interrogator Node Calibration Period
Response Node Transmission Period

FIG. 8

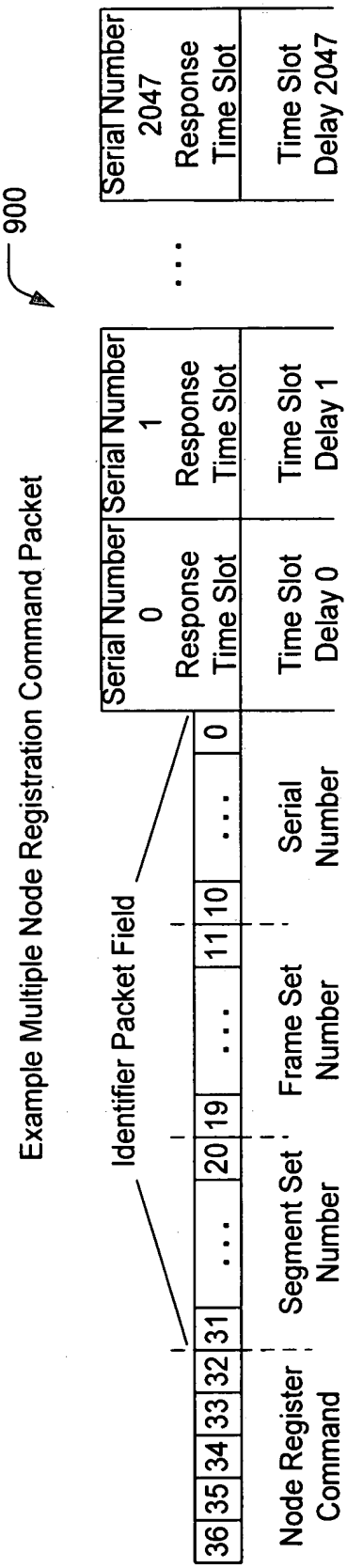
Example Multiple Node Registration Command Packet
900
Identifier Packet Field
36 35 34 33 32 31 ... 20 19 ... 11 10 ... 0
Node Register Command
Segment Set Number
Frame Set Number
Serial Number
Serial Number 0 Response Time Slot
Time Slot Delay 0
Serial Number 1 Response Time Slot
Time Slot Delay 1
...
Serial Number 2047 Response Time Slot
Time Slot Delay 2047

FIG. 9

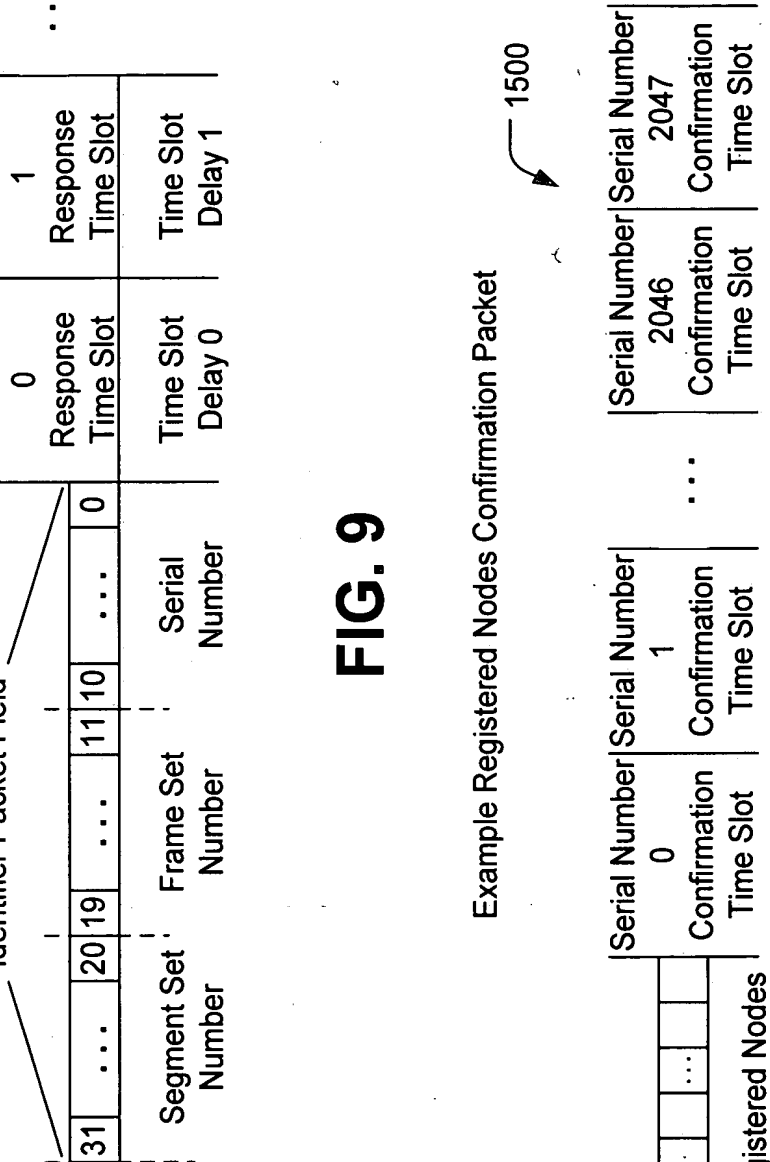
Example Registered Nodes Confirmation Packet
1500
Registered Nodes Confirmation Command
Serial Number 0 Confirmation Time Slot
Serial Number 1 Confirmation Time Slot
...
Serial Number 2046 Confirmation Time Slot
Serial Number 2047 Confirmation Time Slot

FIG. 15

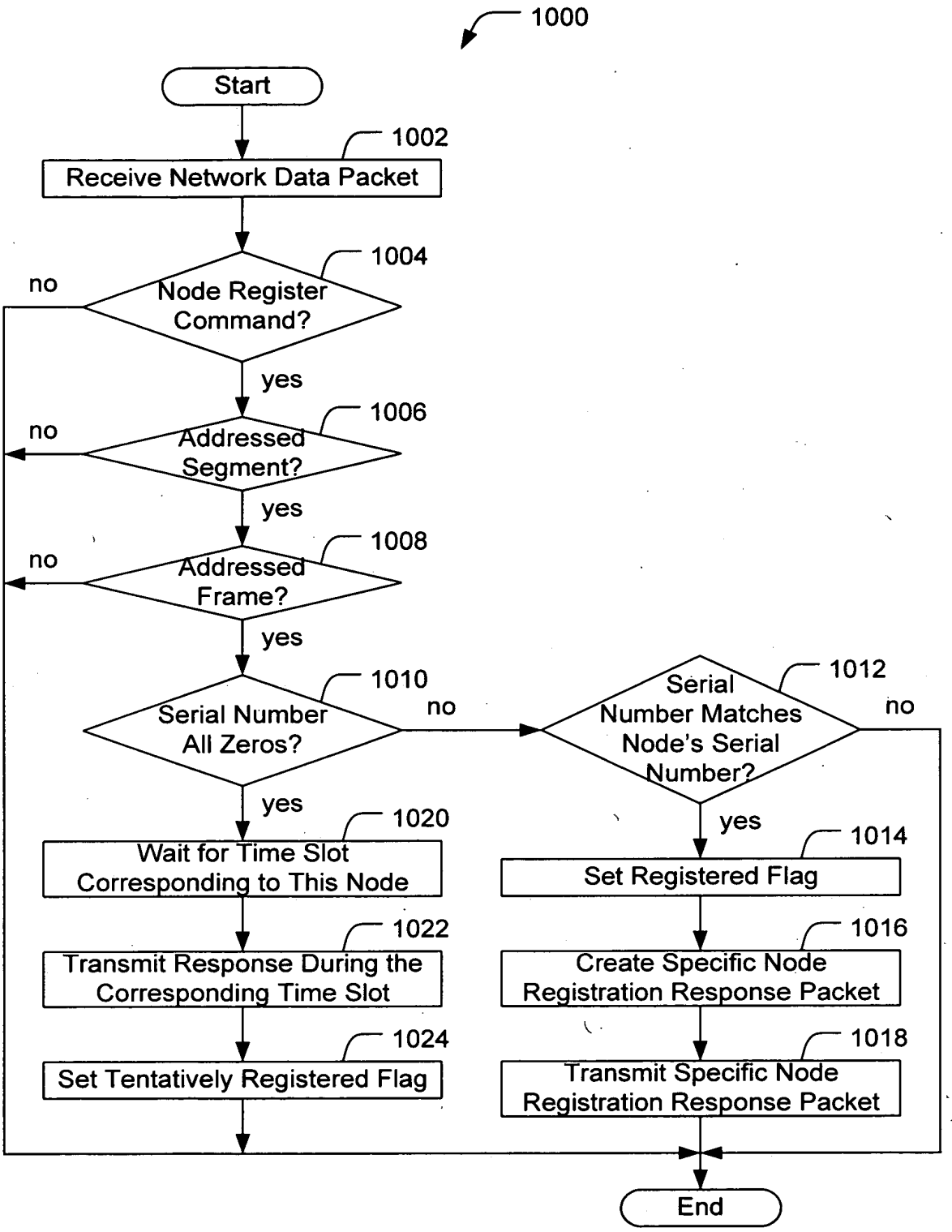
1000
Start
1002
Receive Network Data Packet
1004
Node Register Command?
no
yes
1006
Addressed Segment?
no
yes
1008
Addressed Frame?
no
yes
1010
Serial Number All Zeros?
no
yes
1012
Serial Number Matches Node's Serial Number?
no
yes
1020
Wait for Time Slot Corresponding to This Node
1022
Transmit Response During the Corresponding Time Slot
1024
Set Tentatively Registered Flag
1014
Set Registered Flag
1016
Create Specific Node Registration Response Packet
1018
Transmit Specific Node Registration Response Packet
End

FIG. 10

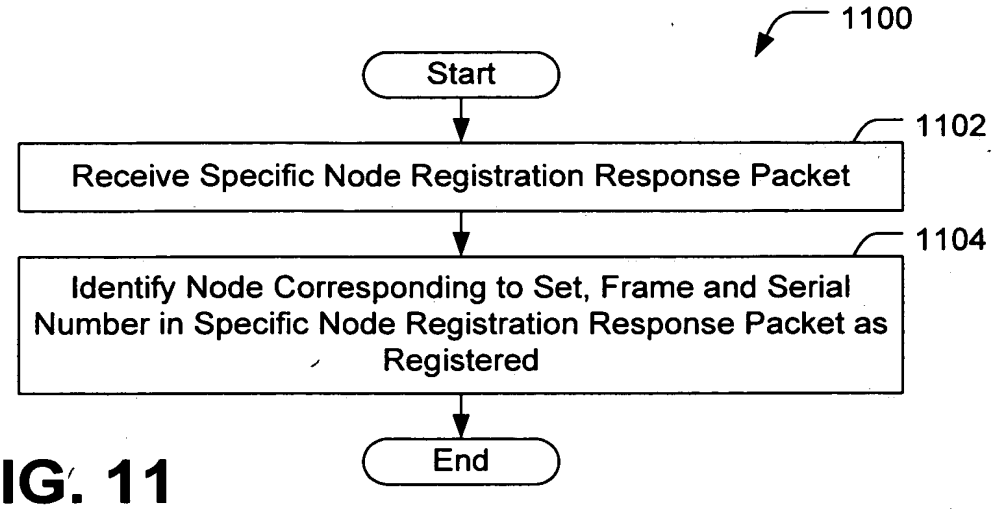
1100
Start
1102
Receive Specific Node Registration Response Packet
1104
Identify Node Corresponding to Set, Frame and Serial Number in Specific Node Registration Response Packet as Registered
End

FIG. 11

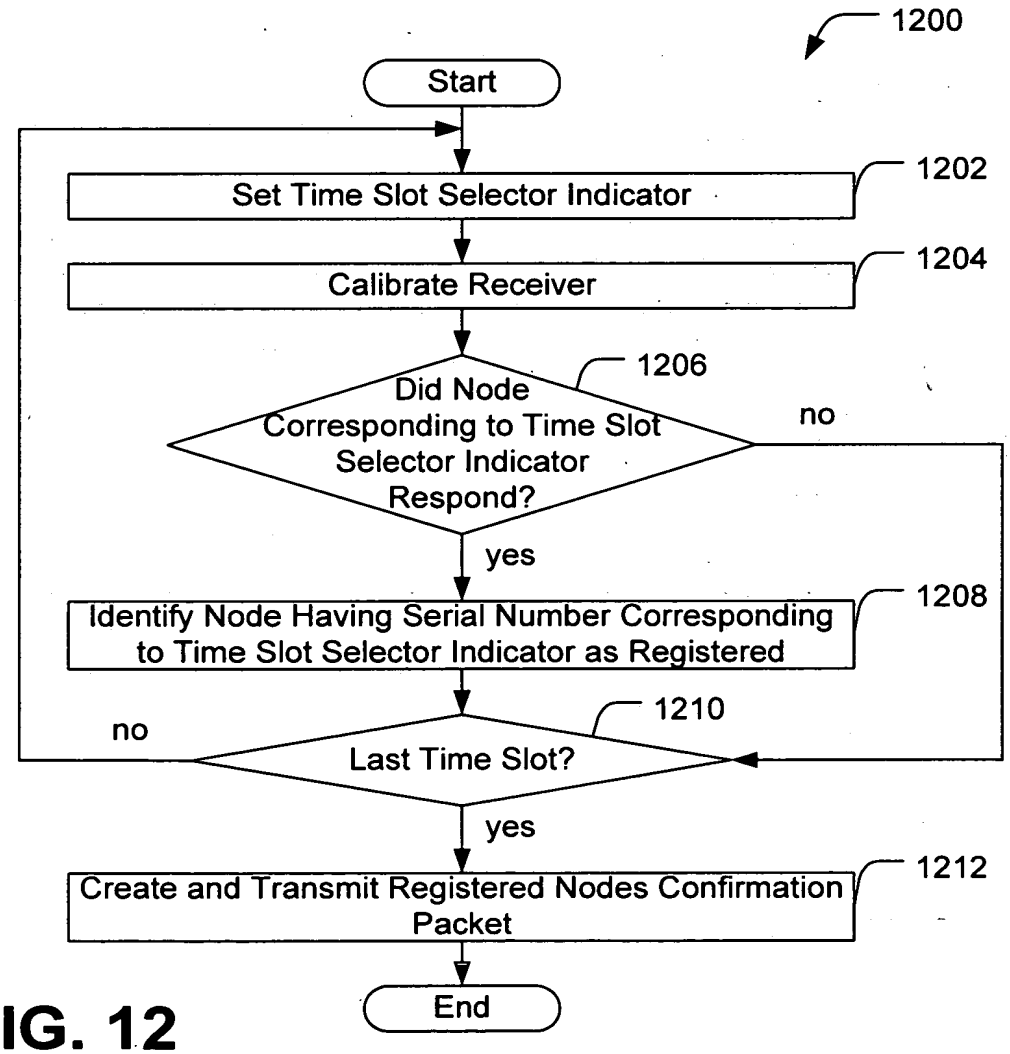
1200
Start
1202
Set Time Slot Selector Indicator
1204
Calibrate Receiver
1206
Did Node Corresponding to Time Slot Selector Indicator Respond?
no
yes
1208
Identify Node Having Serial Number Corresponding to Time Slot Selector Indicator as Registered
1210
Last Time Slot?
no
yes
1212
Create and Transmit Registered Nodes Confirmation Packet
End

FIG. 12

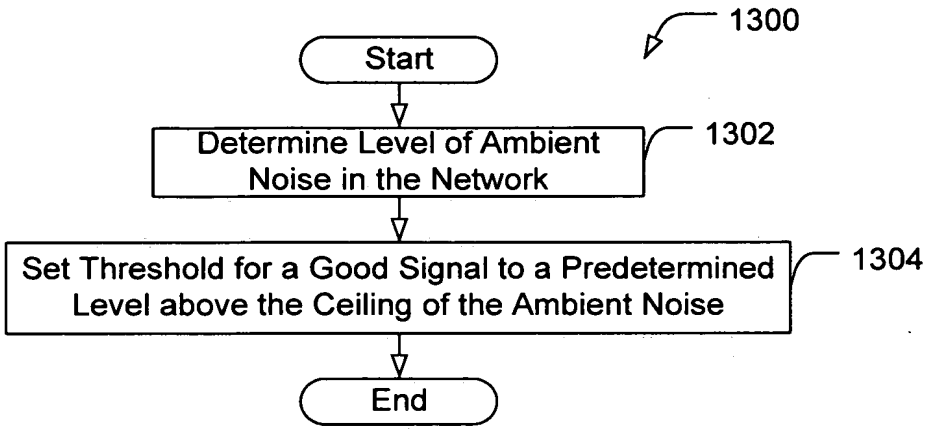
1300
Start
Determine Level of Ambient Noise in the Network
1302
Set Threshold for a Good Signal to a Predetermined Level above the Ceiling of the Ambient Noise
1304
End

FIG. 13

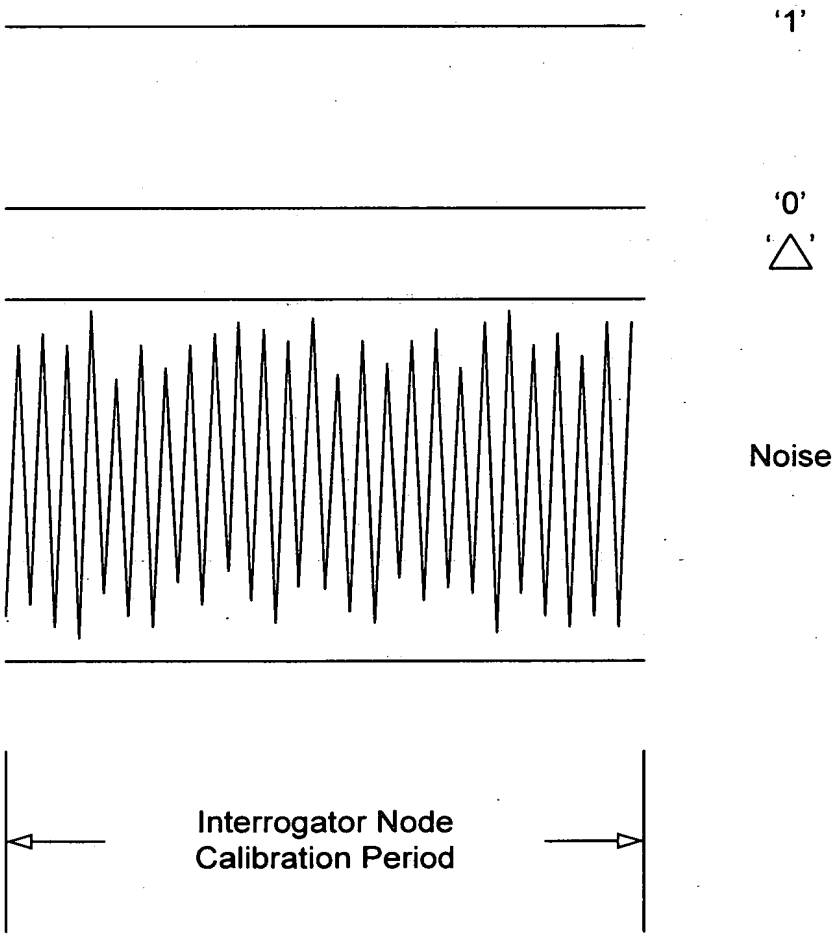
'1'
'0'
'△'
Noise
Interrogator Node Calibration Period

FIG. 14

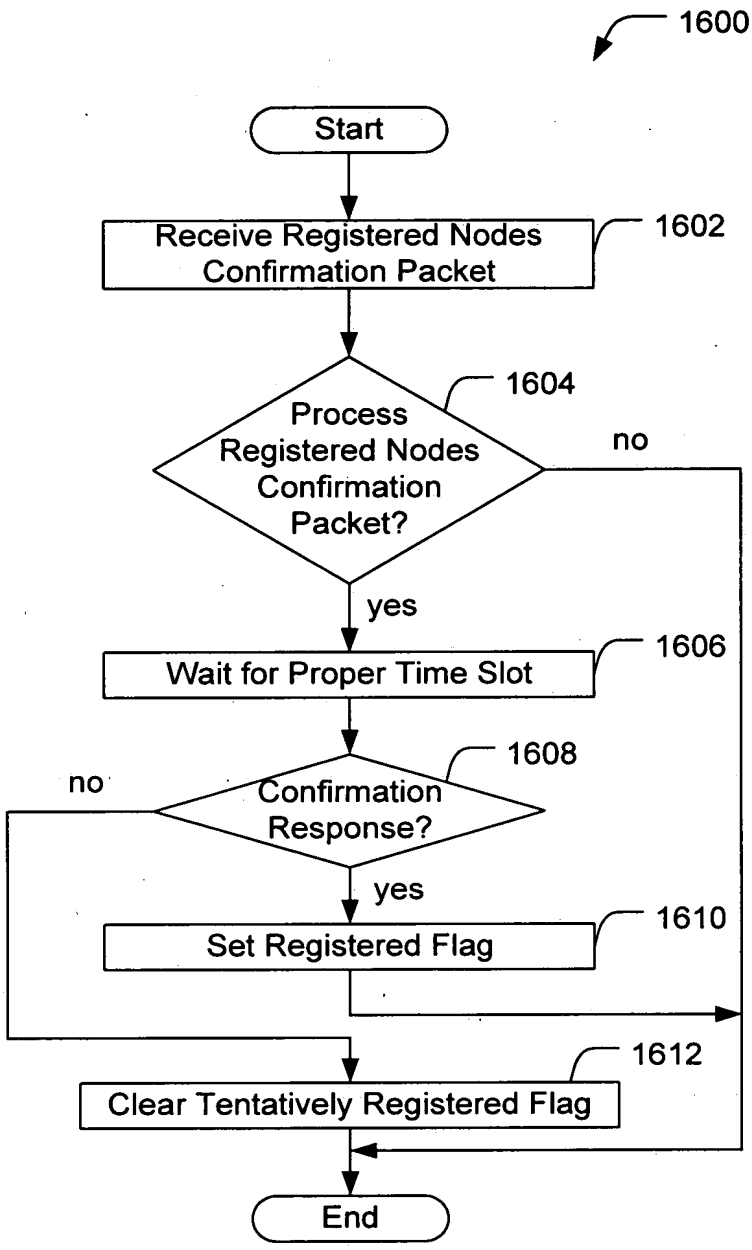
1600
Start
Receive Registered Nodes Confirmation Packet
1602
Process Registered Nodes Confirmation Packet?
1604
no
yes
Wait for Proper Time Slot
1606
Confirmation Response?
1608
no
yes
Set Registered Flag
1610
Clear Tentatively Registered Flag
1612
End

FIG. 16